



**State of Louisiana  
Department of Natural Resources  
Coastal Engineering Division**

**2005/2006 Annual Inspection  
Report**

for

**LAKE CHAPEAU HYDROLOGIC  
RESTORATION**

State Project Number TE-26  
Priority Project List 2

September 30, 2006  
Terrebonne Parish

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## **I. Introduction**

The Lake Chapeau Sediment Input and Hydrologic Restoration Project encompasses 13,549 acres of intermediate and brackish marsh and open water on Point au Fer Island, in the vicinity of Lake Chapeau located approximately 30 miles south of Morgan City, Louisiana, in Terrebonne Parish. The project area is bounded by Four League Bay to the north, Atchafalaya Bay to the west, Locust Bayou and a network of canals to the south, and Wildcat Bayou and an oil field canal to the east (Attachment I). The Lake Chapeau Marsh Creation Project involved the restoration of marsh west of Lake Chapeau and re-establishing a land bridge between Locust Bayou and Alligator Bayou with sediment dredged from the Atchafalaya Bay. The project was constructed in three (3) separate phases. The first component consisted of hydraulic dredging of material from the Atchafalaya Bay to constructed approximately 1,800 acres of marsh. The second component consisted of the construction of seven (7) rock plugs across existing oil field canals to restore the natural circulation and drainage pattern within the central portion of Point au Fer Island. The last component involved dredging Locust Bayou.

Construction of the Lake Chapeau Sediment Input and Hydrologic Restoration Project was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended. The Lake Chapeau Project was approved on the third (3<sup>rd</sup>) Priority Project List.

The property associated with the Lake Chapeau Project is owned by the Terrebonne Parish School Board, Point au Fer LLC, and the Roman Catholic Church - Arch Diocese of New Orleans.

In 2003, the CWPPRA Task Force determined that, due to LDNR being the responsible party for the operation and maintenance phase of the vast majority of the CWPPRA projects, CWPPRA authorized LDNR, through SPR 15950, to be the responsible party for all Post Storm/ Hurricane Assessments. After Hurricanes Katrina and Rita, every project appeared to be impacted by the storms; therefore, LDNR determined that all projects should be assessed for damages (Broussard, 2006). The inspection included a visual observation of all constructed project features and recommended possible corrective actions should maintenance be required. The inspection of the Lake Chapeau Hydrologic Restoration and Marsh Creation Project usually occurs in the first quarter (March/April) of each year; however, due to the devastation and destruction caused by Hurricanes Katrina and Rita, a damage assessment was performed immediately following the storms in October 2005. With concurrence from the federal partner (National Marine Fisheries Service), LDNR has decided not to perform the field inspection for the 2006 annual inspection but rather use the field information gathered on the damage assessment field trip in October 2005 to produce the 2006 annual inspection report.

## **II. Inspection Purpose and Procedures**

The purpose of the annual inspection of the Lake Chapeau Sediment Input and Hydrologic Restoration Project (TE-26) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, LDNR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, construction, and contingencies and an assessment of the urgency of such repairs (O&M Plan, 2002). The annual inspection report also contains a summary of maintenance projects which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance, and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Attachment II. A summary of past operation and maintenance projects completed since completion of the Lake Chapeau Project are outlined in Section IV in the report.

Due to logistics and locations of project features, two (2) inspections were required to complete the damage assessment of the Lake Chapeau Project. On October 6, 2005, rock weirs No. 3 & 4 located on the southwest shoreline of Four League Bay were inspected by LDNR representatives (Daniel Dearmond, Shane Triche and Maury Chatellier). On October 10, 2005, the remaining features of the project were inspected by LDNR representatives (Daniel Dearmond, Shane Triche, Elaine Lear, Chris Williams and Whitney Johnson). This trip included the inspection of five (5) rock weir structures across existing canals on the interior of the project area (Structures #1, 5, 6, 7 & 9) as well as breach repairs made during construction of the project. The federal sponsor and landowner representatives were invited on both trips but were unable to attend. The inspections included a visual inspection of constructed project features of the Lake Chapeau Project as well as the rigid barrier system protecting the structures which was constructed in 2004.

The field inspection included a complete visual inspection of the hydrologic restoration features of the project. The depth of water over the weir sections of the rock plugs was measured at each site. Where available, staff gauge readings were used to determine approximate water levels and elevations of rock weirs. A hand-held GPS unit was used to mark observed breaches along canal spoil banks which may require corrective actions or monitoring on future site visits.

## **III. Project Description and History**

The Lake Chapeau Project involves restoring marshes west of Lake Chapeau to partially re-establish a hydrologic separation (land bridge) between the Locust Bayou and Alligator Bayou watersheds by utilizing sediment input by means of dredging and fill operations and restoring island hydrology by means of plugs/weirs, spoil bank gapping, and maintenance dredging a natural bayou (Environmental Assessment, 1998). The specific goals of the project were to (1) create approximately 260 acres of marsh west of Lake Chapeau and (2) decrease the water level variability within the project area (Monitoring Plan, 2003).

The Lake Chapeau Project was completed with a final inspection held in May 1999. Additional change order work was completed in August 1999, and a Notice of Acceptance was issued by LDNR in October 1999. This project was constructed in three (3) separate phases, with additional features added to address problems encountered during and after construction. The first component of the Lake Chapeau Project consisted of hydraulically dredging 721,931 cubic yards of material from the Atchafalaya Bay, approximately 900 feet off the west central shoreline of Point au Fer Island. The material was hydraulically placed to an average thickness of two feet to create approximately 168 acres of marsh (target final elevation of +0.5 ft. NGVD). In August 1999, a rock plug was constructed at the Atchafalaya Bay shoreline end of the dredge discharge pipeline corridor under a change order. In April 2000, 39,396 smooth cord grass plugs were planted over the newly created marsh under a separate contract. The second project component consisted of the construction of seven (7) rock plug structures across existing oil field canals. The plugs were constructed using a lightweight aggregate as core material wrapped with geotextile fabric and covered with 250-lb. class riprap. These rock plugs were constructed across man-made channels around the perimeter of the Lake Chapeau project area in order to restore the natural circulation and drainage patterns within the central portion of Point au Fer Island. Additionally, under a change order to the contract, breach repair work was completed in January 1999 to address deterioration of the spoil banks in a canal located southwest of Lake Chapeau just west of plug Site No. 9. The repair work included a rock plug (breach site 2) and three dredged material closures (breach sites 1A, 1B, and 1C). This change order also included the installation of a supplemental warning buoy system at six of the plug locations. The third project component involved dredging 59,218 cubic yards of material from a 6,400 foot long silted section of Locust Bayou to its original navigable depth of -6.0 ft. NGVD. The dredged material was placed along the sides of the bayou in 1.5 foot high by 80 foot wide spoil banks with periodic gaps to allow drainage (Picciolla & Associates, Final Report).

The principle project features include:

#### Construction Unit No.1

- Hydraulic Fill – 721,931 cubic yards of sediment (168 acres marsh)
- Planting of approximately 40,000 smooth cord grass plugs

#### Construction Unit No.2

- Site No. 1 – Rock plug – 150 linear feet (LF)
- Site No. 3 – Rock plug – 229 LF
- Site No. 4 – Rock plug – 174 LF
- Site No. 5 – Rock plug – 70 LF
- Site No. 6 – Rock plug – 145 LF
- Site No. 7 – Rock plug – 157 LF
- Site No. 9 – Rock plug – 240 LF

#### Construction Unit No.3

- Dredging 6,400 LF Locust Bayou to -6.0 ft. NGVD

The Lake Chapeau Sediment Input and Hydrologic Restoration Project (TE-26) has a twenty-year (20 year) economic life which began in May 1999. Attached is the three (3) year projected budget for the project (See Attachment III).

#### **IV. Summary of Past Operation and Maintenance Projects**

Below is a summary of completed maintenance projects and operation tasks performed since October 1999, the Notice of Acceptance date for the Lake Chapeau Sediment Input and Hydrologic Restoration Project (TE-26).

**June 2000** – Repair of spoil bank breach by constructing a rock weir (breach site 3) and the repair and maintenance of five spoil bank areas (breach sites 4 through 8) by bucket dredged material in a canal located southwest of Lake Chapeau just west of plug Site No. 9. This work was performed by Johnny F. Smith Truck & Dragline Service, Inc. of Slidell, LA as part of the Point au Fer Project (TE-22) Phase III construction contract. Notice of Acceptance for this work was issued by LDNR in September 2000.

The TE-26 Lake Chapeau Warning Buoy Replacement project was completed on October 19, 2004 at a cost of \$273,670.00. This project replaced the warning buoys with a timber pile and galvanized pipe warning barricade. The barricades were placed on all rock weir structures except weir 3.

A proposed dedicated dredging project is currently being surveyed. The project is to place dredged material from Atchafalaya Bay to complete the fill area that was proposed in the original Lake Chapeau Sediment Input and Hydrologic Restoration Project Plan. Approximately 150 acres of marsh will be created west of Lake Chapeau.

#### **V. Inspection Results**

##### **General Observations:**

From storm reports, Hurricane Rita produced her strongest winds from the south and southeast causing high storm surges in the project area. It was evident from the water remaining on the interior marshes of the island that the entire project area was inundated with several feet of water for a period of time. At the time of the inspection and after flood waters had receded, several inches of water continued to cover the interior marsh. We concluded from visual observations that it is possible that the interior marsh had settled due to the overbearing weight of waters from the storm surge produced by Hurricane Rita. Also, the marsh vegetation appeared to be burnt from high salinity flood waters inundating the project area.

Attachment III graphically illustrates the salinity and water level data captured by four continuous recorders deployed for project specific monitoring.

## **TE-26 Lake Chapeau Marsh Creation and Hydrologic Restoration**

### **Inspection Results:**

A visual inspection of the rock weirs and previous breach repairs indicated that the project features of the Lake Chapeau Project had sustained very little damage. The rock rip rap structures were in good condition with no signs of displacement or settlement from storm surges brought on by Hurricane Rita. However, we did observe significant erosion adjacent to structure #3 located on the southwest bank of Four League Bay. The marsh on the north side the structure had eroded exposing the rock dike to potential breaching. We anticipate that the southwest bank of the structure will be breached within the next year and require maintenance to extend the rock weir to the nearest stable marsh. (See photos below)



*TE-26 – Structure No.3 – rock riprap weir with boat bay located along the southwest bank of Four League Bay looking north.*





*TE-26 – Structure No.3 – photo showing erosion along the shoreline north of rock rip rap weir looking west.*



*TE-26 – Structure No.3 – photo showing erosion along the shoreline on the north side of structure looking southwest.*



## **VI. Conclusions and Recommendations**

From visual observation of the existing project features, we found significant erosion along the shoreline on the north side of structure no.3. Although erosion in this area was evident, the structure has not breached and no negative impacts are expected in the immediate future. As the bank line erodes in this area, the rock weir connection to the marsh will become breached and repairs will be required. At this time, we do not recommend any corrective actions. No FEMA claims are warranted.

## **References:**

Broussard, G. M., 2006. *Damage Assessment Report for Hurricanes Katrina and Rita*, Louisiana Department of Natural Resources, Coastal Engineering Division.

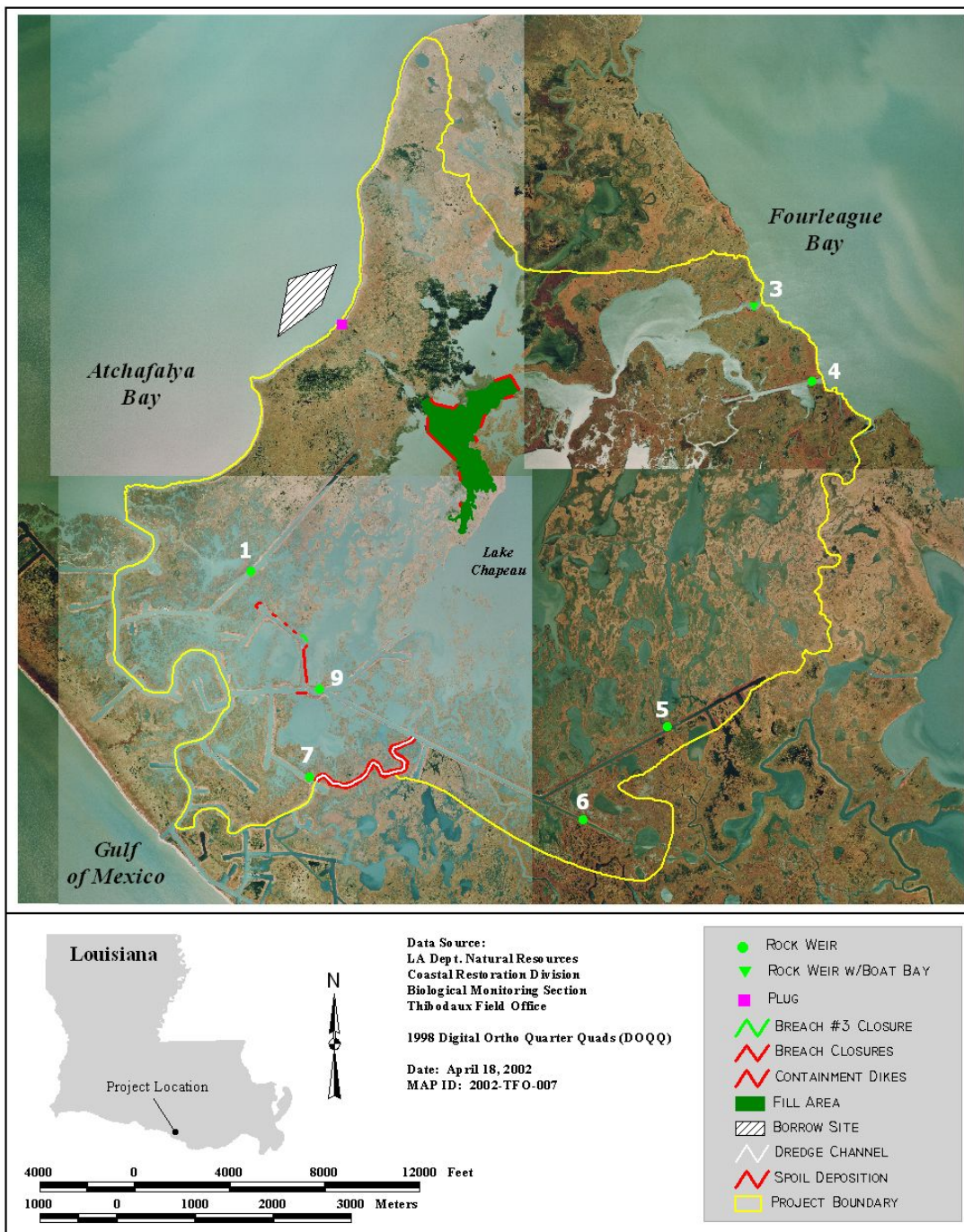
U.S. Department of Commerce/ NOAA National Marine Fisheries Service, *August 1998. Environmental Assessment of Point au Fer Island Hydrologic Restoration Project*, CWPPRA Project No. PTE-24/26, Terrebonne Parish.

Picciolla & Associates, 2000. *Final Report*, Lake Chapeau Sediment Delivery Input/ Hydrologic Restoration Project and Point au Fer island Hydrologic Restoration.

Rapp J.M., Clark N.M., Kane S., 2001. *Comprehensive Monitoring Report No.1*, Point au Fer Island Restoration (TE-22), Louisiana Department of Natural Resources, Coastal Restoration Division.

Lear, E., August 2003. *Monitoring Plan*, Lake Chapeau Sediment Input and Hydrologic Restoration, Point au Fer Island (TE-26), Louisiana Department of Natural Resources, Coastal Restoration Division.

Attachment I  
Project Features Map



## Attachment II

### Three Year Budge Projections and Worksheets

Lake Chapeau Marsh Creation/ Hydrologic Restortaion/ TE-26 / PPL 3			
Three-Year Operations & Maintenance Budgets 07/01/2006 - 06/30/09			
Project Manager	O & M Manager	Federal Sponsor	Prepared By
Brian Babin	Shane Triche	NMFS	Brian Babin
	2006/2007	2007/2008	2008/2009
Maintenance Inspection	\$ 5,250.00	\$ 5,407.00	\$ 5,569.00
Structure Operation			
Administration			\$ 2,000.00
Maintenance/Rehabilitation			
06/07 Description:			
E&D			
Construction			
Construction Oversight			
Sub Total - Maint. And Rehab.	\$ -		
07/08 Description: Breach repair along existing marsh adjacent to Structure No.3			
E&D		\$ 14,000.00	
Construction		\$ 193,878.00	
Construction Oversight		\$ 25,000.00	
Sub Total - Maint. And Rehab.		\$ 232,878.00	
08/09 Description: Secondary Monument Adjustment			
E&D			
Construction			\$ 10,000.00
Construction Oversight			\$ -
		Sub Total - Maint. And Rehab.	\$ 10,000.00
	2006/2007	2007/2008	2008/2009
Annual O&M Budgets	\$ 5,250.00	\$ 238,285.00	\$ 17,569.00
O & M Budget (3 yr Total)			\$261,104.00
Unexpended O & M Funds			\$35,235.00
Remaining O & M Budget (Projected)			(\$225,869.00)

## OPERATIONS & MAINTENANCE BUDGET WORKSHEET

**Project: TE-26 Lake Chapeau Marsh Creation and Hydrologic Restoration**

**FY 06/07 –**

Administration	\$ 0
O&M Inspection & Report	\$ 5,250
Operation:	\$ 0
Maintenance:	\$ 0

**Operation and Maintenance Assumptions: None**

**FY 07/08 –**

Administration	\$ 0
O&M Inspection & Report	\$ 5,407
Operation:	\$ 0
Maintenance:	\$232,878

Construction:	Construction Cost:	\$193,878
	E&D, Admin:	\$ 39,000
Overall Project Cost:		\$232,878

**Operation and Maintenance Assumptions:**

Repair breach along existing marsh adjacent to Structure No.3. Estimated quantity of rock for maintenance repairs is 1,370 tons.

Construction Cost:	
Mobilization/Demobilization:	\$ 40,000
Rock rip-rap: (1,370 tons @ \$80/ton)	\$109,600
Geotextile Fabric: (917 sq.yds. @ \$6/s.y.)	<u>\$ 5,502</u>

Sub-total Construction:	\$155,102
25% contingency:	\$ 38,776

<b>Total Estimated Construction:</b>	<b>\$193,878</b>
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Engineering, Design, Bidding:	\$ 9,000
Surveying:	\$ 5,000
Construction Admin:	\$ 4,000
Inspection (30 days @ \$600/day)	\$18,000
LDNR/NMFS Administration:	<u>\$ 3,000</u>
<b>Total E&amp;D, Const Insp./Oversight:</b>	<b>\$ 39,000</b>

**FY 08/09 –**

Administration	\$ 2,000
O&M Inspection & Report	\$ 5,569
Operation:	\$ 0
Maintenance:	\$ 10,000

**Operation and Maintenance Assumptions:**

Possible adjustment of secondary monuments:  
Two (2) monuments @ \$5,000 each = \$10,000  
LDNR Administration



## Attachment III

### Water Level and Salinity Data

### Hurricane Katrina and Rita: Water Level and Salinity Data

During Hurricanes Katrina and Rita, four continuous recorders remained in place and captured the effects of the hurricanes with respect to the salinity and water levels. Figure 1 illustrates the location of the four continuous recorders. Figures 2 and 3 illustrate the salinity and water level response as a result of the passing of the hurricanes.

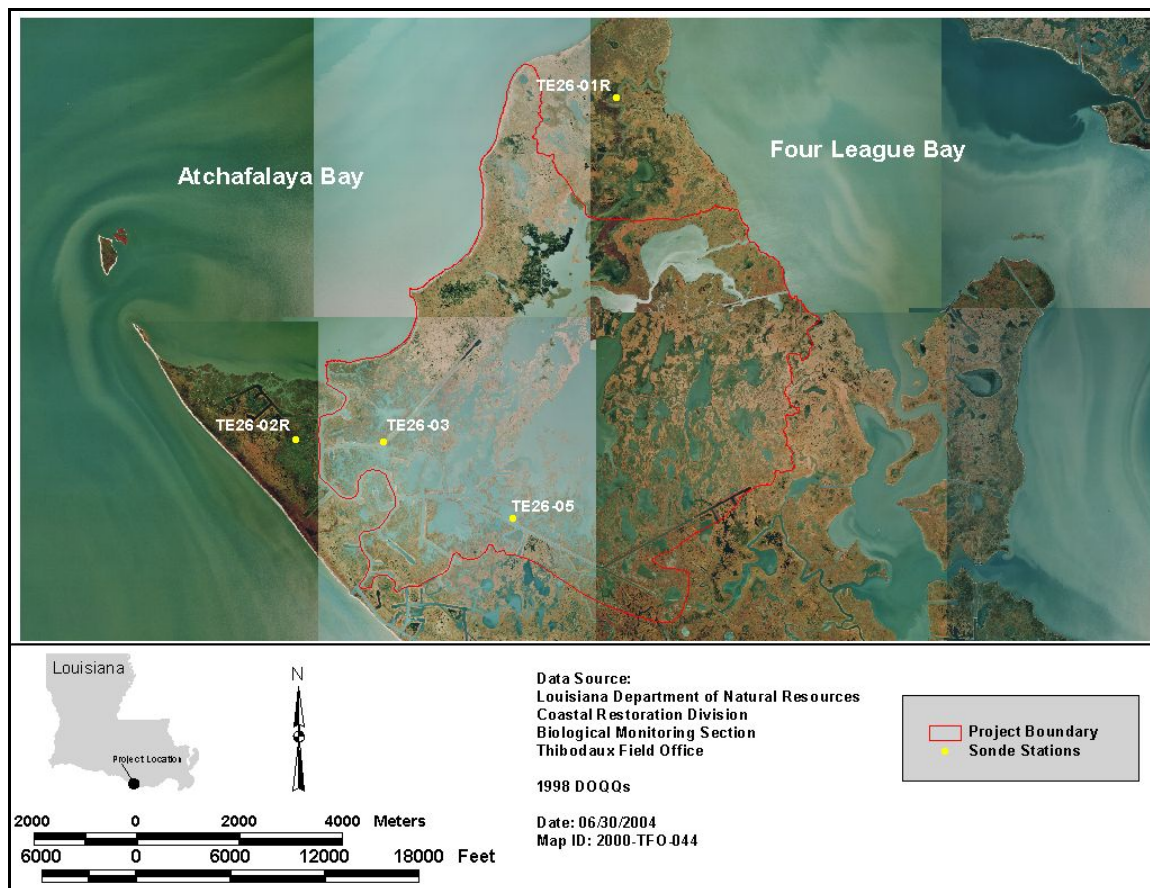
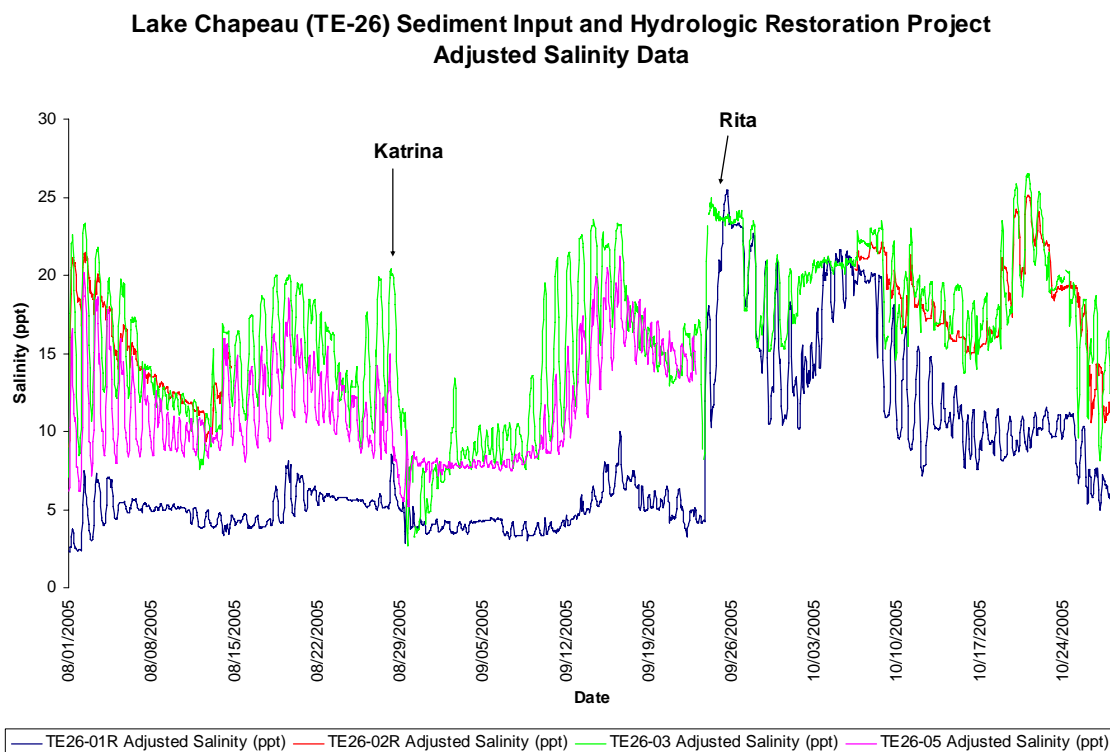
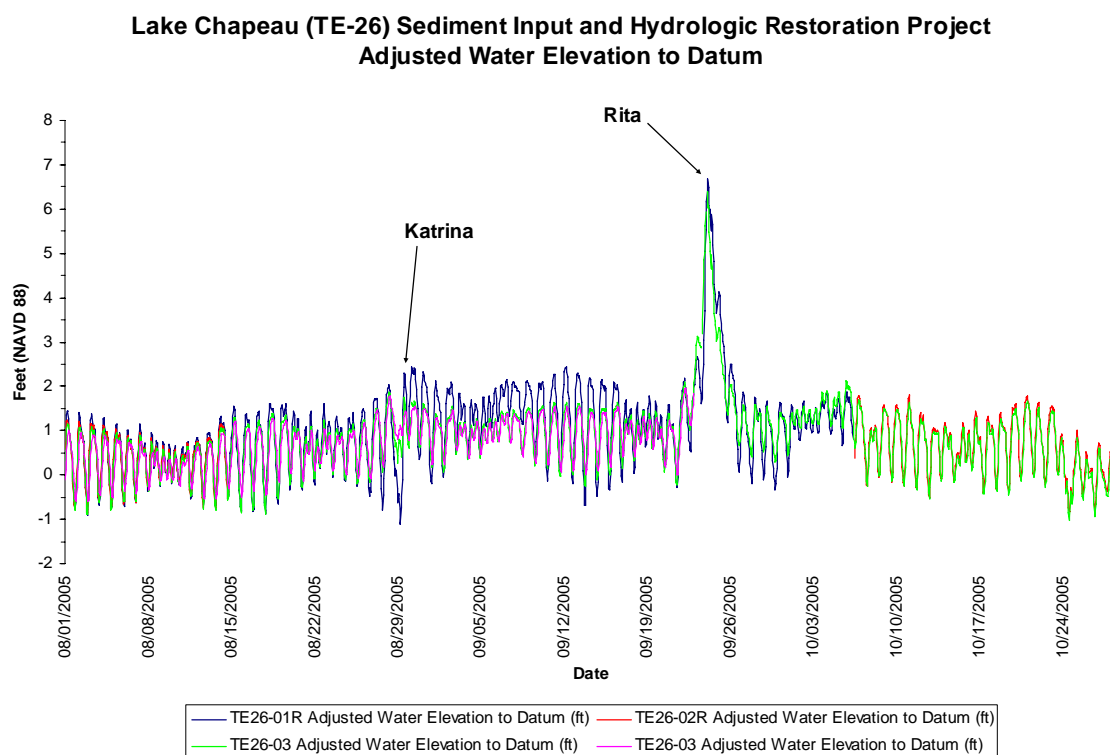


Figure 1: Continuous recorders location associated with the Lake Chapeau Marsh Creation and Hydrologic Restoration (TE-26) project.



**Figure 2: Salinity comparison of the four continuous recorders associated with the project.**



**Figure 3: Water level comparison of the four continuous recorders associated with the project.**